case which the present writer has used with much satisfaction.

The mount consists of a rectangular, wooden frame of any desired size (*e. g.*, 10 × 12 inches) made of pine strips three eighths of an inch square in thickness, mitered or mortised at the corners, holding apart two sheets of glass corresponding in size to the outer edge of the frame, one for the top and one for the bottom of the mount, which is bound together with passe-partout 1¼ inch wide. As for the glass, old photographic plates, 10 × 12 inches in size, cleaned with caustic potash solution, are convenient in dimensions, thin and light, and of good quality.

Each butterfly is prepared by stretching and drying it upon its dorsal surface, pinning it temporarily until it has been made fast with strips of paper. The wings of the dried specimen must lie flat, or be inclined slightly ventrad, but never dorsad. It is then fastened, with a small drop of thin liquid glue applied to the dorsal surface of the thorax, to the sheet of glass that is used as the upper pane or cover. Small strips of sheet lead (about 1 inch × 1½ inches), bent into an arch, make a convenient weight to set astride the wings until the specimen is well fastened to the glass. The pane is then inverted over the frame, and glued to it. The lower sheet should not be glued to the frame, but fastened to it only by the strip of passe-partout, 1¼ inch wide, which is used to hold the two panes of glass together and seal the mount. If a specimen should get loose, the bottom glass may be easily cut away, repairs made, and the case sealed with fresh passepartout. If the upper pane should get broken, it is a simple matter to remove the specimens, using steam when necessary, and remount them. Care should be taken in the preliminary stretching of the specimens lest the feet should project more than necessary, so that, when the case is put together, they come into contact with the lower plate, and loosen the attachment to the upper. For ordinary purposes, however, it is only necessary to trim off the tips of a few that project excessively.

Seven hundred butterflies of the size of *Colias philodice* can be filed away in the space of a single cubic foot, in the mounting frames just described, each case measuring 10 × 12 inches in breadth and length and one half inch in thickness, and containing 25 specimens. They are sealed from dust and vermin, and easily examined on both surfaces in groups of convenient size.

A rich field for conquest awaits any one who chooses to leave the beaten tracks of entomology and scout among the fastnesses of experimental evolution. When one considers the remarkable results that have been accomplished single handed by such observers as Standfuss, Tower, Doncaster and T. H. Morgan, not to mention many others, the possibilities achieved in this field if the huge army of observers already interested in insects should attack in an organized way the problems of variation, the inheritance of acquired characters, mutation and natural selection, polymorphism and sex, mimicry and protective resemblance, can hardly be overestimated. Desultory observations of the strolling naturalist will not help much in this conquest, but long-continued breeding of carefully selected strains under well-controlled conditions can not fail to win valuable results.

Entomological societies and journals of the future, in order to contribute effectively to the real advancement of science should organize cooperative plans of research along these lines, and enlist the services of the countless observers whose random notes now fill their archives.

JOHN H. GEROULD

VARIEGATION OF EUROPEAN ALFALFAS

As a part of the extensive investigations being conducted with alfalfa at the Dickinson, North Dakota Sub-station, a series of European alfalfas was planted in the nursery in 1909. A study of some of the plants in 1910 revealed the presence of variegation in flower coloring. This was expected to a certain extent. As a preliminary to the determination of the correlation of the variegation to other characters, both physiological and morphological, the percentage of variegation was determined for each strain or planting.

Variegation is a feature of certain alfalfas, which undoubtedly indicates that at some previous time at least one parent has been the yellow-flowered sickle lucern, *Medicago falcata*. The flowers of the pure *Medicago sativa* retain their original color from the time of blooming to the time of withering. The color may range from nearly white to some shade of violet, but the color, whatever it may be, remains stable during the period of bloom. The flowers of *M. falcata* are of a chrome yellow, and remain constant, as do the flowers of *M. sativa*. The flowers of the hybrids of these two plants show a range of coloration during bloom, before withering, which, in extreme cases, runs from rich pansy violet through lettuce-green to coppery-yellow. Even in plants having apparently but a small proportion of *falcata* parentage this variegation of color is retained, though in a manner much less pronounced than in the case instanced.

The alfalfas under experiment which are given below were secured through the United States Department of Agriculture. Many of them were obtained from abroad through the energy of Mr. Charles J. Brand, of that department.

The number at the left of each strain is the seed and plant introduction number of the Department of Agriculture. The names are the translations of the German common names, or in many instances, the locality whence the seed was obtained is alone given. The total number of plants of each strain and the percentage of variegation are given.

A supplementary table is given which groups the alfalfa strains according to their geographic origin or to the name borne by them in Europe.

Summarizing the foregoing table we have the following:

[1] At the time of determination of variegation the various rows were indicated by arbitrary numbers. The results were thus not biased by previous knowledge. The variegation was determined by the presence or absence of color change in the standards of the unwithered flowers. This was readily determined in most cases. But in any case, all plants were subjected to a practically uniform judgment.

S. P. I. No.	Name and Source	Number of Plants	Per[1] Cent. Variegated
25110	Commercial Sand Lucern (Switzerland)	22	72.7
25178	Commercial Sand Lucern (Bohemia)	39	64.2
25175	Old German Franconian alfalfa (Bavaria, Germany)	43	56.0
24667	Old German Franconian alfalfa (Bavaria, Germany)	46	54.4
25182	Eifeler lucern (Rhenish, Prussia)	13	54.0
25267	German alfalfa (Prussia)	35	51.5
24733	Old German Franconian alfalfa (Baden, Germany)	43	49.0
25184	Provence alfalfa (Germany)	15	46.6
24602	Provence alfalfa (Germany)	42	40.5
25194	Old German Franconian alfalfa (Bavaria, Germany)	32	40.5
25257	Pfalzer lucern (Baden, Germany)	28	39.4
24923	Old German Franconian alfalfa (Württemberg, Germany)	42	38.0
25269	Roumanian alfalfa (Southern)	36	36.0
24603	Commercial Sand Lucern (Erfurt, Germany)	42	35.8
24635	Old German Franconian alfalfa (Baden, Germany)	41	34.2
24740	Italian alfalfa (northern Italy)	42	33.4
25022	Old German Franconian alfalfa (Baden, Germany)	43	32.6
24721	Provence alfalfa (France)	35	31.5
24767	Old German Franconian alfalfa (Baden, Germany)	42	31.0
25183	Old German Franconian alfalfa (Baden, Germany)	13	30.4
25115	Commercial Sand Lucern (Bromberg, Prussia)	37	29.8
25091	Commercial Sand Lucern (Strasburg, Germany)	41	29.2
24727	German alfalfa (Baden)	44	27.3
24741	Commercial Sand Lucern (Bohemia)	44	27.3
24735	Italian alfalfa	38	26.2
23394	Commercial Sand Lucern (France)	34	26.2
25112	Commercial Sand Lucern (Switzerland)	24	25.0
24718	Moravian alfalfa (Bohemia)	43	23.3
25193	Old German Franconian alfalfa (Baden, Germany)	39	23.0
24728	German alfalfa (Baden)	44	22.7
25111	Commercial Sand Lucern (Switzerland)	22	22.3
24722	Provence alfalfa (France)	45	22.2
25268	Commercial Sand Lucern (Bohemia)	37	21.4
25176	Commercial Sand Lucern (Bohemia)	43	21.0
23481	Commercial Sand Lucern (Hamburg, Germany)	40	20.0
25167	German alfalfa (Thuringia)	41	19.5
25270	Roumanian alfalfa (northern)	36	19.4
24719	Hungarian alfalfa (Austria)	43	18.6
24717	Bohemian alfalfa (Austria)	44	18.3
24730	Russian alfalfa (southern Russia)	46	17.4

S. P. I. No.	Name and Source	Number of Plants	Per Cent. Variegated.
25187	Italian alfalfa (Pisa)	36	16.6
24928	Provence alfalfa (Germany)	39	15.3
24723	Russian alfalfa (southern Russia)	46	15.2
24858	Italian alfalfa (Florence)	40	15.0
25181	Pfalzer Lucern (Bavarian Palatinate, Germany)	14	14.3
24732	Russian alfalfa (northern Russia)	46	13.0
24720	Provence alfalfa (Germany)	39	12.8
24729	Hungarian alfalfa (Austria)	44	12.7
23396	Commercial Sand Lucern (Darmstadt, Germany)	35	11.4
24731	Russian alfalfa (southern Russia)	45	11.1
25186	Algerian alfalfa (Setif, Algeria)	19	10.5
25180	Moravian alfalfa (Bohemia)	39	10.3
24724	Russian alfalfa (northern Russia)	41	9.7
24737	Commercial Sand Lucern (Bohemia)	41	9.7
24734	Provence alfalfa (Germany)	42	9.5
25185	Hungarian alfalfa (Austria)	13	7.7
25179	Hungarian alfalfa (Austria)	40	7.5
24725	Spanish alfalfa	33	6.0
25109	Austrian alfalfa (Vienna)	37	5.4
25168	Commercial Sand Lucern (Bohemia)	40	0
24736	Spanish alfalfa	36	0
24726	Turkestan alfalfa	43	0
24738	Turkestan alfalfa	42	0
24739	Turkestan alfalfa	43	0
	Average	37	24.1

Name	Number of Strains	Average Per Cent. of Variegation	Average Deviation
Turkestan alfalfa	3	0	0
Spanish alfalfa	2	3	3
Austrian alfalfa	1	5.4	0
Algerian alfalfa	1	10.5	0
Hungarian alfalfa	4	11.6	4.0
Russian alfalfa	5	13.3	2.4
Moravian alfalfa	2	16.8	6.5
Bohemian alfalfa	1	18.3	0
Italian alfalfa	4	22.8	7
Provence alfalfa	7	25.5	12
Palatine (Pfalzer) alfalfa	2	26.8	12.5
Roumanian alfalfa	2	27.7	8.3
Commercial Sand Lucern	15	27.7	12.4
German alfalfa	4	30.2	10.7
Old German Franconian alfalfa	10	38.9	8.9
Eifel alfalfa	1	54.0	0
Combined variegated forms (*i. e.*, omitting Turkestans)	61	25.3	

SOCIETIES AND ACADEMIES

THE GEOLOGICAL SOCIETY OF WASHINGTON

At the 234th meeting of the society, held on Wednesday, November 30, 1910, the following papers were read:

Regular Program

The Influence of Marine Currents on Deposition in Continental Seas: E. O. ULRICH.

This paper tends to prove that Mr. Bailey Willis's views in regard to non-deposition in continental seas as the result of current action are in the main unfounded. In brief, Mr. Willis's views are that the numerous minor hiatuses in the geologic column are commonly to be attributed to non-deposition and even to submarine scour, resulting from marine currents, rather than to emergence of the sea bottom. In preface brief allusions were made to instances of local thinning or absence of sediments that may be justly ascribed to current work. It is doubtless true that marine currents flow at certain times through sub-marginal troughs like the Lævis channel.

Arguments were brought against Willis's views under two headings, namely: the improbability of the existence in Paleozoic continental seas of currents competent to bring about such results; and the lack of evidence of such action having taken place under conditions obviously the most favorable for the existence of such currents.

Currents of sufficient intensity to cause an appreciable interruption of deposition over wide interior areas could only exist in great seas, in which the admittedly necessary "trans-continental currents" of Willis might be developed. Such seas have no foundation in fact. At any given time the Paleozoic seas of North America were far less extensive than those delineated by Willis or even those depicted in Schuchert's "Paleogeography of North America." Such maps are synthetic, giving the maximum development of several successive seas. The Black River—early Trenton submergence—having, as generally believed, the greatest areal development of any Paleozoic seas, may be taken as the extreme example. This submergence consisted of no less than five and possibly six distinct transgressions, as shown by the areal distribution of the successive faunas and of the beds containing them. These six faunas are sharply defined and any two juxtaposed faunas show clearly by the varying direction of the overlap of their containing formations that they invaded from quite different oceanic basins. Moreover, no two of these faunas